

From ab4el.com Tue Aug 26 00:00:00 1994  
From: bruce.florip@amail.amdahl.com  
Subject: "Toner Method"

Hi all,

Would someone please describe the "Toner Method" of PC Board Creation? I've seen it mentioned a few times in various articles and letters. I've also seen the ads for Tek Film. Is that the same process? Thanks, Bruce (AA7AR/6)

P.S. My one attempt ended in partial transfer, and curled transparency...

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: rohrwerk@holonet.net  
Subject: "Toner Method"

On           bruce.florip@amail.amdahl wrote to   qrp@Think.COM:

> Would someone please describe the "Toner Method" of PC Board Creation?  
> I've seen it mentioned a few times in various articles and letters.  
> I've also seen the ads for Tek Film. Is that the same process?  
> Thanks, Bruce (AA7AR/6)  
>  
> P.S. My one attempt ended in partial transfer, and curled  
> transparency...  
>

My R2 PC board was made with the "toner method" on plain photocopy paper. It didn't work really well for me -- lots of places the copper is so thin that I tinned it to death and measured every trace to be sure it conducted!

In this method, you make a nice dark copy, mirror image, on your paper, then you iron the paper to the board, melting the toner on. Then you soften the paper by soaking in a bleach solution, and carefully remove it.

You're really at the mercy of how much toner is on the paper. I guess you should also use a nice slick paper so little toner sinks into the paper when copying.

I would like to try the TEK film after my paper experience.

: John Seboldt	rohrwerk@holonet.net	/	I am Bach of Borg...
: Amateur radio	K0JD...	/	your style will be
: Church of the	Annunciation,	/	assimilated.
: Minneapolis		/	

-> Alice4Mac 2.3 E QWK Eval:05Mar94

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: rohrwerk@holonet.net  
Subject: 2nd exchange

On 08-23-94 pepperb@gov.on.ca wrote to qrp@Think.COM:

> Either there are too few cw operators on, or I am on too much, or it  
> is just serendipity... but last week I worked a station for the 2nd  
> time ( and an inet qrp list member at that), and last night I worked a  
> fellow I had worked first time back in April.

I have had a lot more "2nd QSO's" lately also. I think there ARE fewer CW ops  
crammed into the ever-shrinking CW segments. Also, I can get on during the day  
on Mondays (my day off) and I tend to hear from a lot of the retired guys with  
time on their hands. So the likelihood of working them again rises a bit.

> Anyhow, that's the news from somewhat north-east of Lake Wobegon.

So Lake Wobegon is famous even north of the border... >sigh< ... do (did) they  
play him on the radio, or do you just read the books?

: John Seboldt rohrwerk@holonet.net / I am Bach of Borg...  
: Amateur radio K0JD... / your style will be  
: Church of the Annunciation, / assimilated.  
: Minneapolis /

-> Alice4Mac 2.3 E QWK Eval:05Mar94

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: torell@sicom.com  
Subject: 9V Batt Capacity

Looking at the Digi-Key catalog, a standard 9V zinc carbon battery  
has about 0.4 amp-hr capacity at a 10 mA discharge rate. The  
alkaline battery is slightly better, but can support a 50 mA discharge  
rate due to its lower internal impedance. The batteries were discharged  
down to around 5 volts.  
Kent Torell torell@sicom.com

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: ARDAI@MAVEN.DNET.ICD.teradyne.com

Subject: ANNOUNCEMENT: QRP LIST MOVES TO NETCOM

The qrp mailing list has been moved from Think.com to netcom.com. Here is the newinfo file for the list.

Note:

- The list name is now qrp-l@netcom.com. Please stop using the copy of the list on think.com
- Send mail to listserv@netcom.com to subscribe and unsubscribe
- Currently, there is no digest version of the list (I am waiting for netcom to upgrade their Majordomo. Digest subscribers have been added to the regular mailing list.
- For the time being, the FTP archives will remain on think.

If you have any questions, send me mail at nlist@netcom.com.

Thanks very much to Bruce for maintaining the list up to now.

72,  
/mike

~~~~~  
Welcome to the Internet QRP mailing list.

The QRP mailing list is open for discussion of any subjects relating to low-power amateur radio operation. Example topics: portable operation, equipment design and construction, solar and battery power, QRPp, contesting, kit building, ....

There is also an anonymous FTP repository on host Think.COM in directory pub/radio/ham/qrp. This directory will hold things relating to this group, including the archives of the mailing list and whatever relevant contributions y'all come up with. If you want to upload something, mail it to QRP-Admin, or if it's really big, ask QRP-Admin what to do. There is no list of Frequently Asked Questions (FAQ) and answers for this list. If it becomes apparent we need a FAQ, we'll talk about it over the list itself; if you have ideas about what it should contain, help us out and write it up!

This list was started by Chuck Adams (adams@sgi.com) by an announcement on the rec.radio.amateur.misc USENET group in early 1993. Bruce Walker maintained the mailing lists and FTP area from then through August 1994. Chuck is still the keeper of the non-electronic archives, including copies of some schematics, etc. Contact him directly or watch this list for more info.

This mailing list is maintained by Majordomo. Send mail to listserv@netcom.com with the following commands in the body of the message (the subject is ignored)

To subscribe:   subscribe qrp-l

To unsubscribe: unsubscribe qrp-l  
For more information: help

Please keep your mailing address up to date. If your account is being changed or shut down, please update majordomo. If your mail bounces for 'no such user' or 'no such machine', you will be removed from the lists.

To send a message to the list, mail it to 'qrp-l@netcom.com'.

This list is sponsored by the Boston Amateur Radio Club.  
If you have any questions, I can be reached at nlist@netcom.com  
For more information on the Boston ARC, subscribe to barc-list

73,

Michael L. Ardai N1IST

These are the ham-related mailing lists available on Netcom. For more info on any of these, send a message with 'info barc-list' in the body. (Replace barc-list with any other list you want info on.)

arrl-exam-list: amateur radio license examinations scheduled in the US and  
in some foreign areas.  
arrl-nediv-list: bi-monthly bulletins from the ARRL NE Division director  
arrl-ve-list: Info for ARRL VEs from the VEC  
barc-list: Information, discussion and announcements for the Boston Amateur  
Radio Club and hams in Eastern Massachusetts.  
qrp-l: Low-power radios - construction and operating  
w1aw-list: ARRL bulletins, news, and information  
newsline-list: Redistribution of Amateur Radio Newsline  
letter-list: Redistribution of the ARRL Letter  
barc-races: RACES in Massachusetts and emergency management  
fox-list: Fox hunting and Radio Direction Finding  
kyln-list: VE exams in New England  
fieldorg-l: ARRL field organization discussions  
ham-tech: Technical discussions and questions about Amateur Radio

From ab4el.com Tue Aug 26 00:00:00 1994  
From: rehm@zso.dec.com  
Subject: ARK4 + Compact Loop --> Blew the final

Well, I have my ARK4 together (except the keyer, which I didn't purchase yet, and the audio filter which I was too impatient to put together yet).

I also built the 40-20 Compact Loop, using the inexpensive \$19.95 Radio Shack SWR meter to tune with. (It's all I could afford at this point.)

Anyway, the Compact Loop tuned up OK on an ICOM-751, meaning, both my RS SWR meter, and the 751's SWR meter showed low SWR when the tuning capacitor was appropriately adjusted. Tuning for max receive noise/signal got me to the right area to start with, and small tweaks brought the SWR down to what appears to be 1.2:1 or less. Power out, again using the 751, measured about the same 10-12 watts as I measured into my dummy load. Rotating the antenna yield the expected directionality.

GREAT, I said, let's try the ARK4! So, with the antenna tuned up, I plugged it in and rechecked the SWR. Still low, (1.2:1 or less), but I noticed that the ARK4 sidetone, instead of being the sweet (600 Hz?) tone that I got when testing into the dummy load, now had a strong modulation or hum. Detuning the antenna to a high SWR (and less strong received signal), the sidetone came back nice and sweet.

So, I went back and tuned to low SWR and transmitted, and eventually I blew the final transistor (MRF476). I found a replacement part at the Seattle Amature Radio Supply, but I still don't know what to do. Since the ARK4 transmits just fine into the dummy load (homebrew, using six 300 Ohm, 2 watt resistors in parallel), and the signal as monitored on the ICOM-751 sounds fine (no clicks, hum, modulation, etc.), I don't think I've screwed up the ARK4 transmitter section.

Any one have any clues?

My next step, of course, will be to rig up a dipole, but I don't have a very big lot. Luckily, I have one very tall tree that I'll use to create a sloper from the tree to the far edge of my roof. Trimming carefully (since I don't have an antenna tuner), I hope to build a 40 M dipole resonant at 7.075 MHz. As preventive medicine, I just ordered from Kanga U.S. the parts for the Super-Tee tuner.

/eric rehm  
KJ7AE  
Seattle, WA

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Raymond.Anderson@EBay.Sun.COM (Ray Anderson)  
Subject: Re: ARK4 + Compact Loop --> Blew the final

I'm not familiar with the ARK4 as I don't have one, but just a quick

thought on the problem described by Eric, KJ7AE.

If the rig was in close physical proximity to the antenna it might be possible that some of the radiated RF from the antenna was finding it's way back inside the rig and setting up some sort of feedback. This could explain the distorted sidetone and the frapped final. The fact that everything seems to be OK into dummy load fits in with this theory too.

It will be interesting to hear what the cause is finally determined to be.

73's de Ray WB6TPU

raymonda@uranium.ebay.sun.com

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Mark Monninger <markm@bigfoot.sps.mot.com>  
Subject: Advice for a QRP wannabe?

Greetings all...

I've been lurking here for a while and you guys have fired up my interest in QRP to the point I'd like to give it a try. I had a lot of fun using a borrowed HW-9 when I first got my ticket a few years ago but its owner sold it shortly after I returned it to him so I can't borrow it again. I'd like to build something, preferably from a kit (I don't mind home-brewing but it often takes so long to accumulate the parts that I lose interest). Problem is, there's been lots of info here about lots of rigs I've never heard of (ARKs and Sprints and Spirits and what-have-you) and I don't know where to start looking. I'd like a decent performing rig with 3 or 4 watts output and a decent receiver, preferably (I think) not a DC receiver. So what are some good radios that fall into that category? I guess I could send for a bunch of catalogs but some advice to narrow the field a little would be appreciated. I'd like to keep the price under \$100 if that's possible. Also, what's a good band to start out on? I kinda like 30M but 40 or 20 are close second choices.

Comments/suggestions/advice will be much appreciated.

73... Mark AA7TA

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Craig LaBarge <74740.3166@compuserve.com>  
Subject: Antenna Tuners

Greetings:

I've been following some of the recent threads here regarding antenna tuners. Mentioned several times was the PI configuration (.i.e., series coil with a cap to ground at either end). I've noticed that this configuration is rarely used in commercial transmatches. Rather, most seem to favor the TEE configuration (i.e., two caps in series with a coil to ground in between them).

Are there any particular advantages/disadvantages between the two in terms of there abilities to match unknown impedances to the rig's output? In terms of contruction, it would seem that the PI configuration is mechanically more simple to build since you don't have to isolate the shafts of the capacitors from ground. Of course, in the PI configuration the coil might have to be a little "heftier" since it is in series with the load.

Any opinions on this?

73

Craig WB3GCK

```
=====
| Craig LaBarge WB3GCK/QRP          |           |
| Email: 74740.3166@CompuServe.com   | Just say no |
| Packet: WB3GCK@N3DPU.#EPA.PA.USA.NA | to QRO!    |
| CW: 30 & 40 Meters                 |           |
=====
```

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From: "Kevin L. Anderson" <kla@helios.augustana.edu>  
Subject: Dan's seems to have the Neophyte Receiver on sale

A post (given below from the shortwave list) seems to imply that Dan's Small Parts has the Neophyte on sale right now for \$20. Anyone know about this?

73 de Kevin, KB9IUA

- ----- Forwarded message -----

Date: Fri, 26 Aug 1994 16:03:07 GMT

From ab4el.com Tue Aug 26 00:00:00 1994  
From: "John F. Woods" <jfw@ksr.com>  
Subject: Re: EGG ON MY FACE - Ingram's "whatever it is"

> Thanks for commenting on N7WIMichael's ASCII drawing. I still have to see the  
> QST article -- while you're xeroxing (if you have time), how about dropping me  
> a copy of the diagrams?

Sure, send me an address.

> Something still isn't making sense although the sleeve  
> concept is perfectly clear now from the drawing. I'm hung up on the coil  
> and its supposed function. If the coil actually does "choke off" the r.f. on  
> the "antenna" side of the coax, it will have to be presenting an infinite  
> impedance at some point on the windings to the wave fed onto the outside of the  
> shield at the feed point. What is the inductive reactance of a coil of this  
> dimension on the operating band?

The article is a bit muddled on this, and I have a suspicion that the author's analysis isn't correct. The coil is 13 turns of RG-8 coax on a 6" diameter form. I think that's in the neighborhood of 15uH, which should be something like 300 ohms of reactance. The author says that the impracticality of winding a sufficiently high inductance led him to find a simpler solution, which was to find a coil whose self-resonant frequency was the frequency of interest (due to the rather high parasitic capacitance). I suspect that most of the "isolation" is, in fact, coming from the fact that the coil is roughly a quarter-wave from the transmitter. However, the author claims to have measured the radiation from the antenna at the center of the dipole and near the transmitter (actually he says "near the feed point", but I think that term, applied to a dipole, is usually used to mean the center :-), and found a 15dB difference; not incredible, but indicative of some isolation, at least.

> The other side of the coin: the inside surface of the coax shield is also  
> coiled into an inductor with the same impact -- or am I missing something here?

The inside of the coax doesn't know anything about what happens in the outside world. That's the miracle of transmission lines, and in particular shielded transmission lines. (That's why you can wind a transmission line transformer on a ferrite core and not have it act like just a huge, lossy inductor.)

> But we're still left with the above problem: isolation and the  
> impedance presented to the developing wave on the outside-surface of  
> the coax half of the dipole. The wave going down the wire just hits  
> an infinite impedance open circuit as at the end of any normal radiating  
> element. Maybe something in the QST article can clarify why the author  
> claims that the same end-of-element reflecting plane is created by the coil.

The self-resonant coil provides a high impedance for the radiating wave to "bounce" off of. It doesn't bounce very hard, because it's \*not\* an open circuit, but it does appear to keep most of the RF away from the transmitter. Even without the coil, however, there would still be the required high-impedance node there because it's exactly (almost) a quarter-wave away from a ground.



(Note that there are many antenna designs which are grounded at the "far" end from feed point, relying on that point being far enough away that the feed point sees its desired impedance.)

> Oh boy... maybe this thing will make sense someday. The bazooka and sleeve  
> designs I've seen do something drastic where this coil is.

Yup. The author's gimmick is that he found that it doesn't \*have\* to be drastic. Now, whether this is because his trick is really clever, or because, well, ANYTHING that radiates is an antenna, I'm not entirely sure.

73, John, WB7EEL/1

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From: Adrian Weiss W0RSP English Department <AWEISS@charlie.usd.edu>  
Subject: Re: EGG ON MY FACE - Ingram's "whatever it is"

Hi John:

QTH: 526 N. Dakota St., Vermillion, SD 57069. Many thanks.

Thanks for your comments. Were the dimensions you cited for 40-meters?  
(13t, 6"-dia, ~15uh, Xl=300-Ohms?).

The only thing I can figure is that the "r.f. choke" coil has to somehow be functioning as a trap, which assumes stray capacitive coupling somewhere. The coax on the two side of the coil could perhaps provide that coupling to end up with a series resonant circuit or something.

However, I don't quite follow your reasoning about the "grounded" end (i.e., the transmitter). If we look at the entire 1/2-wave outside of the shield, and an r.f. wave is getting by the coil, then the coil has the same effect as a loading coil -- to extend the length of the antenna. It becomes a center-loaded half-wave [mechanical - god only knows what it is electrically!] element. The presence of the coil simply jams a big chunk of the traveling wave's normal sinusoidal phase shift into a small linear space. Then comes the remaining 1/4-wave to "ground." The current distribution on an antenna element is always defined the end opposite the feedpoint. That's when the current minimum has to be. Open circuit.

I'm getting that old feeling "I gotta make one of these and check it out."

But I have to paint the backside of the house first. Then it's be -25F and snowing. Maybe I'll do it then.

Any more thoughts?

73, Ade

P.S. Antenna forums are fun, eh?

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From:rohrwerk@holonet.net

Subject: FCC to regulate Internet?

On 08-24-94 rehm@zso.dec.com wrote to qrp@Think.COM:

> (UPI) dateline, Washington, DC. The White House confirmed today that  
> the FCC will become the federal agency to assume responsibility for  
> regulating the so called: "Information Super Highway".

....

> Novices will be restricted to operating networked computers having speeds  
> of less than 5 Mhz or operation of SLIP or dial-up connections of no  
> greater than 2400 baud.

ROTFL!!!!!!!!!! It was at this point that I started to "get it..."

: John Seboldt rohrwerk@holonet.net / I am Bach of Borg...  
: Amateur radio K0JD... / your style will be  
: Church of the Annunciation, / assimilated.  
: Minneapolis /

-> Alice4Mac 2.3 E QWK Eval:05Mar94

-----  
From ab4el.com Tue Aug 26 00:00:00 1994

From: "John F. Woods" <jfw@ksr.com>

Subject: Fortuitous coincidence for the fuse-box challenge

I just got the newest Hosfelt Electronics catalog, and not only are they selling surface-mount components in small quantities, they are also selling "Surfboards[TM]", little PC-boards with traces laid out to act as surface-mount prototyping boards. They also have edge pins to allow you to design a circuit module on a Surfboard and plug it into a regular PC-board layout like a single-inline-package IC. The boards come in a range of sizes from under a half-inch squared to just over a square inch.

73, John, WB7EEL/1

-----  
From ab4el.com Tue Aug 26 00:00:00 1994

From: Daniel Damon Roscigno <ddr@BEACH.CIS.UFL.EDU>

Subject: Has anyone built the Neophyte Receiver?

I am considering the purchase of the Neophyte Receiver kit from Dan's kits and small parts. If anyone has built this simple receiver (BTW the kit is on sale for \$20 for the next 20 days) I would appreciate hearing from you. What do

you like about the receiver, dislike, hints etc.

Thanks!

Dan.

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: adams@chuck.dallas.sgi.com (chuck adams)  
Subject: Hy-Gain TH2MK3 Beam

Gang,

I am the proud owner of the above. I obtained it from AA5DX last year and am thinking of cleaning it up and using for the QRP Afield Event in a few weeks.

Anyone got one of these and how do you like it?

This one has been around the world and on a bunch of DX-peditions. Some of them might be famous. :-)

dit dit  
Chuck Adams K5FO CP-60  
adams@sgi.com

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: ryme@wpsmtp.bloomu.edu  
Subject: INET rig - starting point

Greetings,

As a beginning point for the INET rig project, let's call a vote for rig features and comments. Please review the questions below and forward your views to: ryme@husky.bloomu.edu. Any comments or suggestions are welcome.

I will be out of the office until Tuesday AM. At that time I will tally the votes for presentation to the group. Since I will include you comments in the report, please indicate any remarks that are "off the record" or a private opinion.

73,  
John N3PFF

.....  
.....  
Questionnaire:  
check any boxes

- \_ Should we copy an "older production" design?
- \_ Should we modify an "older production" design?
- \_ Should we design a system using modern (new) techniques?
- \_ Should the design be simple and uncomplicated?
- \_ Should the design be more complex with added features?

MODE  
\_ CW    \_SSB    \_ Both    \_other (please comment)

Bands  
\_HF        \_ VHF    \_UHF    \_combination

Additional Comments or suggestions:

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: ryme@wpsmtp.bloomu.edu  
Subject: INET rig - starting point -Forwarded

\*\* Reply Requested by 2/7/2106 (Sunday) \*\*

Date: 8/27/1994 4:45 pm (Saturday)  
From: John Rymell  
To: in:qrp@thnk.com  
Subject: INET rig - starting point

Greetings,

As a beginning point for the INET rig project, let's call a vote for rig features and comments. Please review the questions below and forward your views to: ryme@husky.bloomu.edu. Any comments or suggestions are welcome.

I will be out of the office until Tuesday AM. At that time I will tally the votes for presentation to the group. Since I will include you comments in the report, please indicate any remarks that are "off the record" or a private opinion.

73,  
John N3PFF

.....  
.....  
Questionnaire:  
check any boxes

- \_ Should we copy an "older production" design?
- \_ Should we modify an "older production" design?
- \_ Should we design a system using modern (new) techniques?
- \_ Should the design be simple and uncomplicated?
- \_ Should the design be more complex with added features?

MODE  
\_ CW    \_SSB    \_ Both    \_other (please comment)

Bands  
\_HF        \_ VHF    \_UHF    \_combination

Additional Comments or suggestions:

-----  
  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: rohrwerk@holonet.net  
Subject: Inet rig / R2/T2

On 08-24-94 N8ET@delphi.com wrote to qrp@Think.COM:

> The vfo that KK7B has recommended to me and has used in his rig is the  
> vfo used by W7EL in his "Optimized QRP Transceiver" and also by W7ZOI  
> in the "Ugly Weekender". Again - I have not had time to build on up to  
> try - but I believe that is what was in the 40 meter R1 he loaned me  
> some time ago, and the drift was negligible in my shack over a 30  
> minute period.

There's also the "Universal VFO" by DeMaw in the QRP Notebook -- has 2 buffer stages, the first being a FET. And it's one of those circuits with lots of shunt capacitance, so the drift from the transistor junction capacitances is swamped out.

I built one similar to the W7EL, and I consider it good, but not spectacular. Of course, there are any number of layout things I might be able to do better; I am also a musician, and can hear pitch differences more than some.

Spectacular stability -- now that's a characteristic of my transistorized T-368 exciter! Time to plug it again -- 1.5 to 3 MHz Collins PT0, with multipliers to 3-6, 6-12, and 12-24 MHz. And a digital readout. Tunes fast, but boy does it stay put. Put in 10-turn pots for TX and RX offset with a varicap, and you've got all the fine tuning you want. Details available in a 14K text file I can send you. The units are available from Fair Radio Sales for \$45, last someone told me.

- > On a multiband
- > R2/T2 - This is difficult to do because of the sensitivity to the
- > phase and amplitude adjustment of the two signals coming from the
- > local oscillators.

Well, not *that* bad if you don't mind a 5-minute band change process! :-) My R2 has 3 BNC's on the back (osc1, input, osc2), spaced on 3/4 inch centers. That's so you can change sidebands by flipping the box.

I have one PC board box with 40 and 20 meter input filters, phasing nets (splitter and pi-net type), and a miniature 4pDT slide switch. The input nets can be retuned to 30 meters or 17 meters, but not the phasing nets -- I can run it as a basic d-c rx there (with a LITTLE rejection of the opposite sideband). I also have a 15 meter box, and a basic 80 meter filter w/o phasing net so far. My TX is CW only, so I only have to worry about an output network; if I build the T2, probably have to have another set of boxes :-( ...

Then, to aid in band changing, I have the R2's amplitude balance on the front panel. There is some difference between my 40 and 20 meter null points, but I find that you don't really have to readjust it until maybe you hear a strong signal bleeding through on the "other side". Even without fine adjustment, you get acceptable rejection on most signals.

Oh -- for higher bands I have a broadband preamp based on the MAR-6 MMIC (kit from Electronic Rainbow) that can be switched in. 20 dB gain may be a bit much, but it does lift signals out of the noise, and with today's lousy bands I have seldom heard anything I can attribute to overload.

- > Finally - I would love to see the R2/T2 as part of the Inet rig -
- > but please do not include that as input to any final decision about
- > what is done. (Again - see my catalog - HI!)

Well, it's the rig of choice for this I-netter... the modular approach makes it reasonable. And bandswitching wouldn't be all that hard, if you allocated as much space in a big box as W7ZOI did for the high performance superhet in the Handbook

- > And as a parting teaser - someone mentioned (Gary perhaps) that
- > there was probably an individual out there quietly going ahead with

> all of this. I know of at least one (not me - but I hope to produce it  
> when done...) - and I am looking forward to seeing what is developed -  
> it will use the R2/T2.....

Guess I'm one of them. Keeping it modular is the key, in my mind. Someday  
I'll even build up 2 meter/440 modules for satellite work...

> back to my kits.....

Yes, Bill, you are making a lot possible by providing this stuff. Hope it  
sells like hotcakes.

: John Seboldt rohrwerk@holonet.net / I am Bach of Borg...  
: Amateur radio K0JD... / your style will be  
: Church of the Annunciation, / assimilated.  
: Minneapolis /

-> Alice4Mac 2.3 E QWK Eval:05Mar94

-----  
  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: "John F. Woods" <jfw@ksr.com>  
Subject: Re: Internet rig ruminations

> > >Yes. I would love to see a cw rig that will fit into a 35mm film can.  
> > I'd like to see a SSB rig in a 35mm film can :-)  
> I think a SSB rig should be built into the mic.

Actually, I've got an old desk-set mike that would probably make this a  
piece of cake! :-) Maybe I'll have to buy a spare...

73, John, WB7EEL/1

-----  
  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Clark Fishman (FSAC-FCD) <cfishman@PICA.ARMY.MIL>  
Subject: MC1648 Osc Chip

I have used the 1648 to make fm test oscillators at 10.7 and  
21.4 MHz. These used varactors for the fm signal and were stable.  
The 1648 will to about 200 MHz. The frequency is a function of  
the LC values attached to the chip. The minicircuits MAV-11  
mmic can put out +17 dbm and makes a good buffer chip.

NEW TOPIC

For info on phasing schemes and flip-flop quad L0 generation  
get a copy of the Phillips (used to be Signetics) RF/ Wireless  
data books. There is a good article in there on the Weaver  
scheme for SSB receiving and transmitting and using the NE602  
in low power phasing gear.....If you can't get the book email  
me and I'll send a copy (as soon as the Xerox here gets fixed)

Keep the solder flowing and yes you can get 602's in SMD

Clark Fishman WA2UNN cfishman@pica.army.mil

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: adams@chuck.dallas.sgi.com (chuck adams)  
Subject: Mail Server

Gang,

Are we worried yet about the mail server?  
Does anyone have a UNIX machine for a mail  
server and can maintain an email operation?

I would hate to see this group die because  
of the lack of a machine on the Internet.

It does require someone with reliable and  
immediate mail service and a large amount  
of disk space to maintain the archives.  
There is just too much valuable information  
to be lost here.

I'd volunteer myself, but I don't think that  
SGI will allow me to maintain a mail server  
behind the firewall. The Internet is just  
not the environment for allowing easy access  
to the outside world.

So let's see if someone can come to the  
rescue of the group. It'll be a rewarding  
job, but not much money to be made. :-)

dit dit



Chuck Adams K5FO CP-60  
adams@sgi.com

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: NYOUNG@DESIRE.WRIGHT.EDU  
Subject: More rigs in small boxes

Scott Wood brings up a memory of a transmitter in a pen. I think I saw that one at the '87 Hamvention, when the G-QRP guys first caught my attention. As part of the sign-up deal, I got a bunch of back issues of SPRAT. On page 12 & 13 of Issue #45, there's a rig called "The Fag Box(o) Transmitter." In Ameringlish, that's a transmitter in a cigarette box. Kinda cute, too. The antenna plugs into a socket hidden between the filters of the cancer sticks. It's got a battery, a one transistor oscillator and a one transistor PA. No output filters (Ayyyye!). I thought it was pretty cool when I first saw it. Not something that I'd fiddle with, mind you. With asthma as the geneological by-product in this family, I can't even afford to, as they say in Hindi, ganja pina. Besides, who'd build a transmitter in a baggie. (Ooooh, now there's a challenge for the Woodstock Set [of which I am one only by fault of age. Never went there. In the Navy instead].)

Hmmm. A rig in a baggie. Anyone want to try that. It'd be easy. Just put an NN1G together, get it working and wrap it in, say, oregano or Tetley's. Like the antenna could like come out of a roach, man. Dave ain't here.

73  
Nils  
WB8IJN &c  
Recipient of the "Keeper of the Bong  
award, issued by the CCCC (Cannibis Corps Contest Conspiracy).  
Ex-inhabitant of 3.968 and veteran of the Ohio Valley Teratology  
Net. Ah, them was the days, like you know?  
The price of drugs has driven me to drink.

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: "Michael Bendio (unix dev)" <mb@titan.wordperfect.com>

Subject: Multi-band R2/T2

An idea I've been kicking around is to feed the output of a DDS into a phase-shift network, then use the outputs to drive two PLL frequency synthesizers. This should give a give a very wide frequency range with quadrature output.

On another note, I really like Howie Cahn's idea of a virtual radio. This seems to be a way that we could really help to advance the state of the art. The components could be physically separated (e.g. transmitter and receiver front end near the antenna) if we could come up with some kind of 'bus' (perhaps fiber-optic?) to link the modules.

Michael Bendio      WT7J      mb@titan.wordperfect.com      801 222-5367  
Opinions are my own and aren't necessarily shared by Wordperfect Corporation

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: rohrwerk@holonet.net  
Subject: Multi-band R2/T2

On 08-25-94 sct@po.cwru.edu wrote to qrp@Think.COM:

> The trick to a multi-band R2/T2 may be to use the R2 and T2 as the IF  
> in a superhet rig.

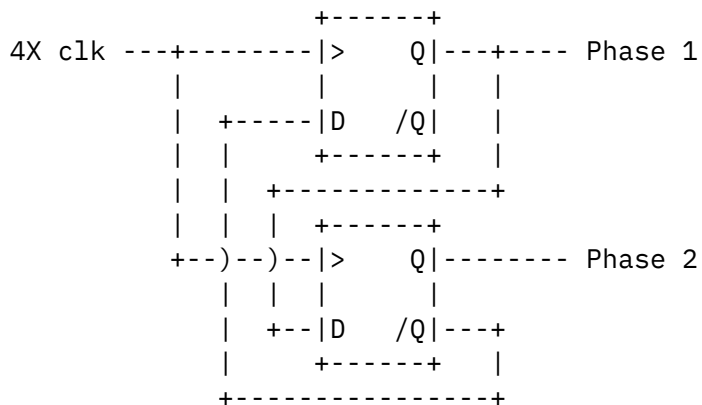
Maybe... but see my other message. The outboard circuitry you use for the various bands is not any more complex than the various converters/oscillators you need for superhets, and it's mostly passive. Bandswitching may be more complicated...

: John Seboldt rohrwerk@holonet.net / I am Bach of Borg...  
: Amateur radio K0JD... / your style will be  
: Church of the Annunciation, / assimilated.  
: Minneapolis /

-> Alice4Mac 2.3 E QWK Eval:05Mar94

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Stephen Trier <sct@po.cwru.edu>  
Subject: Re: Multi-band R2/T2

Making quadrature signals the digital way requires a two-bit ring counter:



The idea is that phase 2 is a copy of phase 1 one cycle ago, but phase 2 is an inverted copy of phase 1 one cycle ago. [In other words,  $P1(n) = /P2(n-1)$  and  $P2(n) = P1(n-1)$ .] Here's a table showing the sequence.

| P1 | P2 |
|----|----|
| 0  | 0  |
| 1  | 0  |
| 1  | 1  |
| 0  | 1  |
| 0  | 0  |

and so on...

You can build it with a single 74x74. I would think the 6m band would be reachable fairly easily, with higher bands possible with ECL logic and great care.

The problems you'll run into are differences in propagation and line driving on the two flip-flops. All the usual problems of digital noise will come along for the ride. Higher frequencies may need attention paid to the line terminations in order to get cleaner transitions.

Stephen

- - -

Stephen Trier                      The photovoltaic cell is not an electronic device  
sct@po.cwru.edu                  in the accepted sense, since the conduction through  
KG8IH                                it occurs in a semiconductor....  
- Standard Handbook for Electrical Engineers, 1941

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From: xenolith@halcyon.com (Kevin Purcell)  
Subject: Re: Multi-band R2/T2

>An idea I've been kicking around is to feed the output of a DDS into a  
>phase-shift network, then use the outputs to drive two PLL frequency  
>synthesizers. This should give a give a very wide frequency range with  
>quadrature output.

A better idea (a much simpler idea) is to look at some of the new DDSes that will generate output in quadrature directly (no phase error!). This is being used to suppress the images on the other side of the IF (essentially a phasing RX with a superhet design).

Or if you really want to use two PLLs, eliminate the phase shift network and use the PLLs in series (remeber the input and output are in quadrature if you use the right phase comparator). I don't know what this does to the noise performance of the oscillator will the second PLL output have more phase noise?

```
DDS  ---- PLL ---- PLL
      |         |
      -45      +45
```

Kevin Purcell, N7WIM / G8UDP            xenolith@halcyon.com            206/649-6489  
Seattle dBug Mac Developers SIG organiser

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Stephen Trier <sct@po.cwru.edu>  
Subject: Re: Multi-band R2/T2

In my tome on doing quadrature with flip-flops, I wrote:  
> The idea is that phase 2 is a copy of phase 1 one cycle ago, but phase 2  
> is an inverted copy of phase 1 one cycle ago.

Uh, right, Stephen, whatever... :-)

Phase 2 is a copy of the previous phase 1, and phase 1 is the inverse of the previous phase 2. That should make it about as clear as mud. I had to write out a table of the cycles to figure out how it worked back when I first encountered it.

Stephen

- - -

Stephen Trier                The photovoltaic cell is not an electronic device  
sct@po.cwru.edu            in the accepted sense, since the conduction through  
KG8IH                       it occurs in a semiconductor....

- Standard Handbook for Electrical Engineers, 1941

-----

From ab4el.com Tue Aug 26 00:00:00 1994

From: rohrwerk@holonet.net

Subject: Re: Multi-band R2/T2

On 08-25-94 mont@netcom.com wrote to sct@po.cwru.edu:

> Are you saying that it would be better to do the above then have  
> multiple switched in phasing networks for the local oscillator? I  
> guess if the actual bandwidth of a given phasing network is too small  
> then this would not be too easy. I am hoping that the bandwidth of a  
> phasing network will be wide enough for one band with the help of  
> varactors that are tuned at the same time as the local oscillator, but  
> I haven't tried out any of this yet.

> Rick, or anyone with R2 experience, can you give us an idea of the  
> bandwidth of the phasing networks you've used?

See my other message. I think it's not all that complicated to have various  
phasing nets for different bands.

Bandwidth... when you null a single tone at about 750 Hz, the perfectionist  
would want to null it in the part of the band he uses the most. But on 40 and  
20 meters, I find it perfectly satisfactory throughout the band. When  
exploring down to the new SW band below 20 meters, and even above to the 19  
meter SW band, you still have \*some\* rejection.

Varactors tuning the phasing network? Forget it, not necessary at all. If you  
tune further than 1 MHz, maybe a manual adjustment would be nice; just hand  
track it like the old preselector days :-)

No doubt 80 meters would be tough throughout the band. Maybe here a manual  
adjustment would be helpful. You could probably mark it for the different  
parts of the band.

: John Seboldt rohrwerk@holonet.net / I am Bach of Borg...  
: Amateur radio K0JD... / your style will be  
: Church of the Annunciation, / assimilated.  
: Minneapolis /

-> Alice4Mac 2.3 E QWK Eval:05Mar94

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From: btoback@netcom.com (Bruce Toback)  
Subject: Re: Multiband R2/T2

Bill N8ET writes:

> Has anyone used one of the Motorola MC1648 oscillator chips?? It has a  
>built in agc loop and derlivers 0dbm at 50 ohms....It would need some  
>amplification to make the R2/T2 play, but mmic's should do that. Anyone know  
>what the freq specs on the 1648 are??

There are a number of circuits using the MC1648 in the ARRL "Solid State Design" publication. He suggests disabling the AGC loop for best noise performance, and also mentions the low power output.

The MC1648 is a MECL III part, so it should be good to around 200 MHz. However, because it's an ECL part, its output voltage swing matches ECL specs, a bit more than a volt at most. (My ECL design book is at home; sorry.) I know the part is good to over 100 MHz because I've seen it used as an LO in FM broadcast receivers.

I'll check the real specs this weekend.

- -- Bruce  
KN6MN

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From: wwm@wa8tzg.mi.org (Bill Meahan)  
Subject: Re: Multiband R2/T2

>From: mcnnnet!delphi.com!N8ET  
>Subject: Re: Multiband R2/T2

>As I understand it from reading Rick's articles, the phasing networks he  
>describes are adequate for any single amateur band. They can be switched,  
>but the problem that arises then is that the ratio of the amplitude of the  
>two 90 degree signals will probably change. That will cause performance to  
>degrade. (note the adjustment pot at the point the signals are recombined -  
>it is there to adjust for any amplitude imbalance. It would have to be  
>re-adjusted every time you switched bands...

There was an article on rec.radio.amateur.homebrew last spring about generating quadrature signals for the R2/T2. The author stated he had developed a broadband ferrite device that generated good quadrature over at least an octave. The results were supposedly published in the proceedings of an ARRL microwave conference of late last year or early this year. My attempts to reach the author at the e-mail address on his article failed miserably (lots of bounced mail) and I've never seen anything about how to get hold of the proceedings (not well cited).

Anybody else remember this or have more information? A ferrite "transformer" ought to be easier to construct than a multi-PLL quadrature generator or the circuitry necessary to clean up the digital noise from the ring-counter approach.

Just my 2 cents.

72/73!

- - -

Bill Meahan WA8TZG

wmeahan@wa8tzg.mi.org

Hey, this is my OWN computer! I can say what I want!

cat: a purr bearing mammal

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: montp@minerva.robadome.com (Mont Pierce)  
Subject: Re: Multiband R2/T2

>From owner-qrp@Think.COM Fri Aug 26 19:52:37 1994  
X-Mailer: \*Cinetic Mail Manager V2.1  
To: qrp@Think.COM  
Subject: Re: Multiband R2/T2  
Sender: owner-qrp@Think.COM

> There was an article on rec.radio.amateur.homebrew last spring about  
> generating quadrature signals for the R2/T2. The author stated he had  
> developed a broadband ferrite device that generated good quadrature over  
> at least an octave. The results were supposedly published in the  
> proceedings of an ARRL microwave conference of late last year or early  
> this year. My attempts to reach the author at the e-mail address on his  
> article failed miserably (lots of bounced mail) and I've never seen  
> anything about how to get hold of the proceedings (not well cited).  
>  
> Anybody else remember this or have more information? A ferrite  
> "transformer" ought to be easier to construct than a multi-PLL  
> quadrature generator or the circuitry necessary to clean up the digital  
> noise from the ring-counter approach.

>

I have a copy of that post in front of me. It is dated 19 Nov 1993. All it says is: "N1EKV came up with something called a twisted-wire quadrature hybrid using a ferrite core and a capacitor or two". Reference: Byron Blanchard, N1EKV, "RF Phase Shifter for Phasing-Type SSB Rigs," Proceedings of the 19th Eastern VHF/UHF Conference, ARRL 1993.

Does anyone have a copy of his design?

Maybe Bill Kelsey N8ET of Kanga USA will look into it for us?! :)

72,  
km6wt

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: "SLRC1::M405142" <M405142%SLRC1.decnec@mdcgwy.mdc.com>  
Subject: Need info on SB300

Wanted: Information on Heathkit SB300 receiver. Anything! Will pay copy expense. Also Wanted: HW-9. Any condition. State price. THX N0XEU, Matt (314) 962-1418 eves, 6-9:PM CST or email.

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Adrian Weiss W0RSP English Department <AWEISS@charlie.usd.edu>  
Subject: NorCal Vol. II #3 of "QRPP"

Hi Doug:

I received my first copy of NorCal's "QRPP: Journal of the Northern Cal. QRP Club" today. WOW! I had been wondering what kind of publication you were putting out, and this knocked my socks off. Maybe this won't make sense to you, but my first reaction in paging thru was something like:

"Boy, this is what I hoped that THE MILLIWATT: NATIONAL JOURNAL OF QRPP would grow into!"

From me, that's the highest kind of complement!

The guys here who are interested in homebrew owe it to themselves to join up. No ASCII drawings in "QRPP" but good artwork, parts lists, discussion of circuitry etc.



Great job and many more years to "QRPP"!

73, Ade (Editor/Publisher" of THE MILLIWATT, 1970-75)

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From: SmithCF%DFEE%USAFA@dfmail.usafa.af.mil  
Subject: Pi vs. T matching networks

WB3GCK writes:

>Are there any particular advantages/disadvantages between the two in  
>terms of  
>their abilities to match unknown impedances to the rig's output? In  
>terms of  
>construction, it would seem that the PI configuration is mechanically more  
>simple to build since you don't have to isolate the shafts of the  
>capacitors  
>from ground. Of course, in the PI configuration the coil might have to  
>be a  
>little "heftier" since it is in series with the load.

>Any opinions on this?

>73

>Craig WB3GCK

The Pi network is a low-pass filter vs the T being a high pass filter.

If I were interested in attenuating harmonics, go for the Pi.

The design formulae:

Call the capacitor in parallel with the load, C2 and the capacitor in

parallel with the input, C1. Let the desired input resistance be  $R_{in}$ , the  
output resistance be  $R_{load}$ , the desired Q be  $Q_t$ , and the desired radian  
frequency,  $\omega_0$ .

$$C1 = Q_t / (R_{in} \omega_0)$$

$$L = \frac{(\sqrt{R_{in}} * (Q_t * \sqrt{R_{in}} + \sqrt{Q_t^2 R_{load} + R_{load} - R_{in}}))}{((1 + Q_t^2) \omega_0)}$$

$$C2 = \frac{\sqrt{Q_t^2 R_{load} + R_{load} - R_{in}}}{(\sqrt{R_{in}} * R_{load} * \omega_0)}$$

note minimum Qt you can desire is

$$Q_{tmin} = \sqrt{R_{in} - R_{load}} / \sqrt{R_{load}}$$

73,

NOPRR

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: "Judy L. Schnabolk" <73043.1704@compuserve.com>  
Subject: QRP SSB/CW XCVR For Sale

Yaesu FT-7 10W PEP SSB/CW transceiver. Covers 3.5-4.0, 7.0-7.5, 14.0-14.5, 21.0-21.5 & 28.0-28.5MHz. Unit has RIT, noise blanker, 1KHz direct frequency readout, semi-breakin keying with sidetone and a lot of high performance features (e.g. doublely balanced diode ring mixers, cascaded IF filters, pre-mixed VFO and push pull broad band power amp using MRF433's.

Mint condition w/ microphone, DC power cable and manual. \$375 + ship

Contact by email: 73043.1704@COMPUSERVE.COM

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: "JEFF M. GOLD" <JMG@tntech.edu>  
Subject: QRPP

All,

I have been reading the newest QRPP.. enjoyed it more than QST this month.. and that says something.. especially when you compare budgets.. came nicely wrapped in plastic.. nice graphics.. great articles.

Doug is truly amazing.

thanks

73

Jeff, AC4HF

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: dsibie@hvsag01.att.com (D R Sibie +1 35 87 2854)  
Subject: Questions after demolition of TV set

Hello qrp fans,

After successful demolition of my old TV set to get parts for building I am looking at a mountain of little parts. Most of them I can figure out what they are, but several, especially the very tiny ones cannot be determined. There are a lot of very small diodes(?, they conduct current only in one way). There are three types: (1) some are printed with characters of pointsize 1 or smaller, (2) some are coloured and (3) some have coloured rings around them.

Examples:

Ad (1): glass body, marked BZX 79 C9V1  
BZX 79C 7V5  
glass body, marked 83C 6V8  
ITT ZDT 8.2  
ITT ZTK 33B

Ad (2): half orange, half purple,  
black body, red end

Ad (3): blue, brown and red ring  
pink body, thick brown and thin brown ring  
grey, yellow, purple and yellow ring on glass body  
orange, brown and green ring on whitish body  
glass body, orange, red and thick pink ring

Can anybody explain what they are and how to determinate them?

Question about my J-pole antenne:

it works marvellous on 144 MHz, but I am confused about the connection of the coax to the copper pipes. In one description I read that the braid should be connected to the short pipe opposite of the connection of the inner conductor to the long pipe. In another description the writer strongly insists on connecting the braid to the middle of the piece of copper that connects both the pipes. Does this really matter in using the J-pole?

Last question: I have send various mail messages to Rev. Dobbs, the mail does not bounce back but I get no answer from him. Does anybody know if there is any reason for this? (My mail address is correct, since he did send me his email address).

Finally thanks to everybody who bothered to send me the email address of Rev. Dobbs.

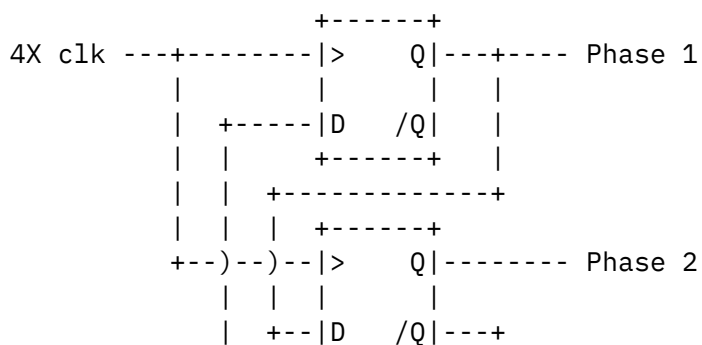
Kind regards, Dirk Sibie, PA3GNR (E-mail: dsibie@hvsag01.att.com)  
AT&T-NS-NL  
Hilversum  
The Netherlands

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Raymond.Anderson@EBay.Sun.COM (Ray Anderson)  
Subject: RF quadrature generators

Steven, KG8IH has provided the following schematic in a recent message of the digital quadrature generation circuit I mentioned yesterday. Someone also mentioned that it has been used in a Signetic app-note. Also, it is shown in the ARRL Solid-State Design Book slightly modified.

Several years ago, (actually I think it was when "Ham Radio Magazine" was still in the small 5x7 format) there was a phasing RX project published which used this circuit to create the quadrature RF. If I remember correctly, the author had a problem in that in his implementation the circuit would randomly start with phase1 leading phase2 sometimes, and then sometimes it would start with phase2 leading phase1. This had the effect of the rig sometimes operating USB and sometimes LSB. There was a simple fix which I don't remember at the moment. I'll try to find the article and post what solution evolved. Anyway, just something to be aware of.

Also, I'm not sure 6 meter operation would be achievable with any commonly available parts short of perhap GaAs. It is not just finding a part that will toggle at 4X the desired output frequency, but in finding ones with sufficiently short delay time and fast enough rise-time to ensure accurate quadrature output. With a 200+ MHz clock to produce 50MHz quadrature signals this may not be a trivial thing.



|        +-----+    |  
+-----+

New Subject, Same Topic:

Michael WT6J writes:

"

An idea I've been kicking around is to feed the output of a DDS into a phase-shift network, then use the outputs to drive two PLL frequency synthesizers. This should give a give a very wide frequency range with quadrature output.

... stuff deleted ... "

A DDS can be configured with two D/A converters appropriately connected to the lookup prom such that the phase difference between the two D/A outputs is always 90 degrees regardless of the frequency the DDS is producing. You store both sine and cosine coefficients in the prom and clock them out simuletaneously. Digital RF solutions (now Proxim Corp.) had an app-note on one implementation of this scheme.

Ray WB6TPU

raymonda@uranium.ebay.sun.com

-----

From ab4el.com Tue Aug 26 00:00:00 1994

From: djwang@sneezy.biophys.upenn.edu

Subject: Re: RF quadrature generators

> A DDS can be configured with two D/A converters appropriately  
>connected to the lookup prom such that the phase difference  
>between the two D/A outputs is always 90 degrees regardless of the  
>frequency the DDS is producing. You store both sine and cosine coefficients  
in the prom and clock them out simuletaneously. Digital RF solutions  
(now Proxim Corp.) had an app-note on one implementation of this scheme.

>

>Ray WB6TPU

The Analog Device chip, AD7008 is actually designed for this task. It has a PROM stored both SINE and COSINE table in it. It also had mixers for the I and Q channel plus

the DAC.

All you need is a DSP board to supply the "Hilbert transformed" audio input. As I had heard

that there is an article in Aug/94 QEX regarding a PC sound card (Cardinal DSP) which use a

DSP chip from Analog device (ADSP21??). The article explains how to program the DSP chip on

the board. SSB rig from 0 to 21 MHZ can be accomplished with a PC + a sound card + a DDS chip.

BTW, I do not have access to the QEX magazine. Can someone who have a copy xerox me the DSP

article? I would gladly pay for the expenses. Thanks and 72/73 D.J. Wang, N2YKP

djwang@sneezy.biophys.upenn.edu

-----  
From ab4el.com Tue Aug 26 00:00:00 1994

From: Raymond.Anderson@EBay.Sun.COM (Ray Anderson)

Subject: Re: RF quadrature generators

In an earlier posting to the net I mentioned that there was the possibility of the simple digital quadrature generator composed of 2 flip-flops coming up in random states when the power was applied.

The schematic posted before (fig. 1) exhibits that problem. An alternative implementation (fig. 2) reportedly does not have this problem.

I haven't run these circuits thru a digital simulator yet to verify this, but the ARRL Solid State Circuit Design Book claims it is so.

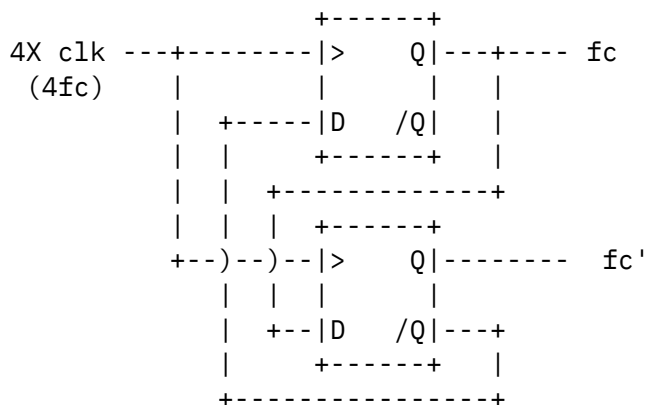


Figure. 1

(may come up in random states)

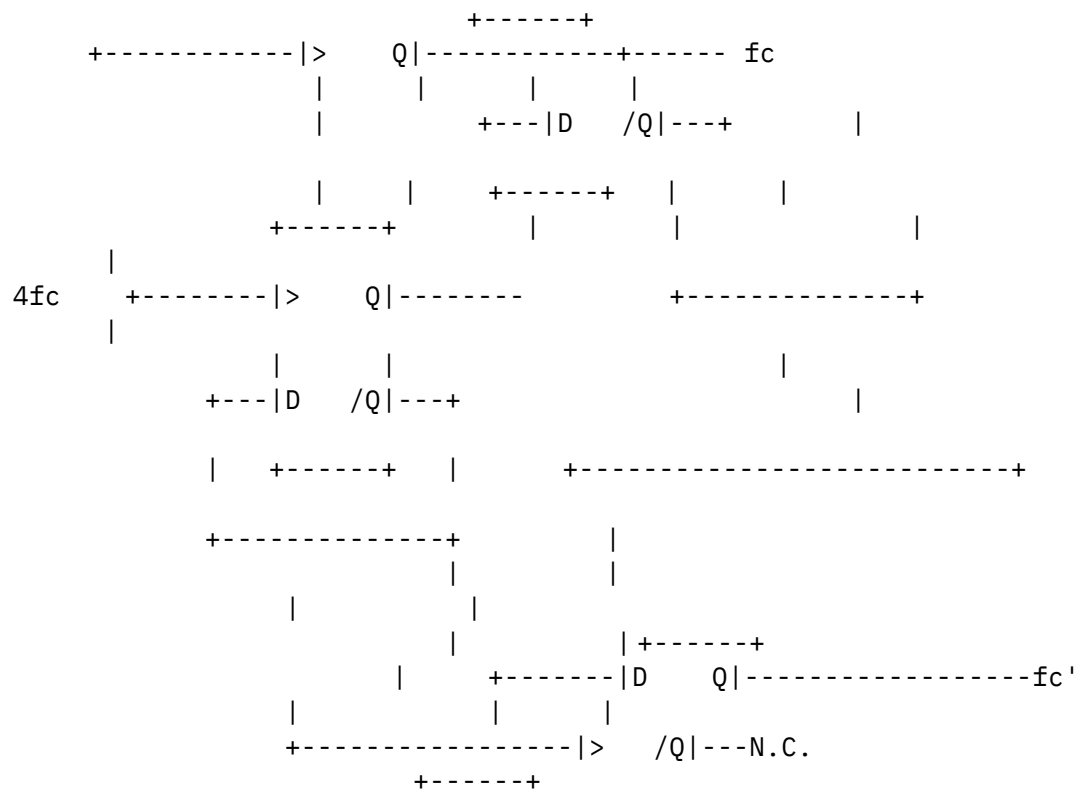


Figure 2  
(always comes up the same)

Just for completeness there is an implementation that requires 2X the clock frequency instead of 4X. The gotcha is that it insists on exactly 50% duty cycle to provide exactly 90 degree phase shift at the output. The above circuits driven by 4X the desired output frequency do not have the requirement for a 50% duty cycle drive signal.

73's de WB6TPU Ray

raymonda@uranium.ebay.sun.com

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Mark J Schreiner <schreine@pogo.den.mmc.com>  
Subject: Re: RF quadrature generators

I should be able to find that issue of \QEX for you. Please send me your mailing address.

Mark, NK8Q/3

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Raymond.Anderson@EBay.Sun.COM (Ray Anderson)  
Subject: Re: RF quadrature generators

- ----- Begin Included Message -----

>From sct@pop.cwru.edu Fri Aug 26 16:10 PDT 1994

From ab4el.com Tue Aug 26 00:00:00 1994  
From: Stephen Trier <sct@po.cwru.edu>  
Subject: Re: RF quadrature generators

Ray Anderson writes:

> If I remember correctly, the author had a problem in that in his  
> implementation the circuit would randomly start with phase1 leading  
> phase2 sometimes, and then sometimes it would start with phase2  
> leading phase1.

That's interesting. I don't see how that could happen with a ring counter like this, since the state at any given point is 100% determined by the previous state, with no undefined states. If you get more details, I'd be interested in hearing about it.

> Also, I'm not sure 6 meter operation would be achievable with any commonly  
> available parts short of perhap GaAs.

I had in mind ECL. You're right, though, that might not be good enough. For a one-degree maximum error, we need a maximum difference in propagation delay of 55 ps, or 5% of the 1ns delay of the faster ECL families. That is asking a lot.

Someone "borrowed" my MECL databook and hasn't returned it despite numerous pleas, so I can't check any of the specs. :-(

Stephen

- - -

Stephen Trier  
sct@po.cwru.edu

The photovoltaic cell is not an electronic device  
in the accepted sense, since the conduction through



KG8IH                    it occurs in a semiconductor....  
- Standard Handbook for Electrical Engineers, 1941

- ----- End Included Message -----

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From: rohrwerk@holonet.net  
Subject: Re: Random wire tuner? et

On 08-23-94 AWEISS@charlie.usd.edu wrote to owner-qrp@Think.COM:

> Interesting thread.

Indeed.

> One point should be clarified, namely, the "zero" or "null" length  
> of coax. It doesn't exist.

Sounds logical.

> The point made in the discussion regarding that mismatch is a good  
> one. Bear in mind that two impedance transformations occur: 1) antenna  
> thru tuner to coax, 2) coax to transmitter output.

[judicious editing]

> The only way to  
> know that is what is happening is by the suggested methods of  
> measurement -- r.f. current in the feedline, or a field strength  
> meter.  
>

Since seeing this thread, I have been checking line current in one leg of my balanced line as well as SWR at 50 ohms at the input. My QRP tuner now has a pass-through toroid current pickup on one leg of the output (FT-50-43, about 20 turns), with a diode, filter cap, and an LED as a relative output indicator.

In most cases, in debating whether you tune for low SWR or maximum antenna current/field strength, I find that you're definitely splitting hairs. The differences are quite slight in my installation. They are greater at higher frequencies in my resonant matching network (based on DeMaw's circuit in "W1FB's QRP Notebook"); there is no difference I can read (with my instruments anyway) in my balanced L-network.

With the resonant network, finding the best tuning point can be more

complicated; tune only for peak output, and I sometimes got an outlandish SWR on the input that the rig won't like. Starting with tuning for low SWR helped me get in the ballpark, after which I watched the output for final adjustment. If the SWR looks a little excessive, compromising toward the low SWR side makes only a tiny difference in output.

That's my experience, anyway. Others?

```
: John Seboldt rohrwerk@holonet.net / I am Bach of Borg...
: Amateur radio K0JD... / your style will be
: Church of the Annunciation, / assimilated.
: Minneapolis /
```

-> Alice4Mac 2.3 E QWK Eval:05Mar94

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: janderson@polycom.com  
Subject: Re: Re 35mm rig

Although this gets away from the stated goal, I think a REALLY neat rig would be one which was built inside a standard nine volt battery case, but with the battery connector left on and used as the external power connector. To apply power, just plug another nine volt battery into the rig's connector and operate: The rig, plus power source, would look just like two nine volt batteries with their tops plugged together end to end.

By the way, what are the power ratings/characteristics of 9 volt batteries?

I'd rather not put a rig into a partially disassembled 9 volt battery (using the remaining cells as power). After all, what happens when those cells die? Throw away the radio? Dig apart another nine volt battery? It would be a fun exercise and contest task, but impractical for a real radio.

Surface mount may be the way to go, but it is a ROYAL PAIN to hand solder.

- Jeff, WA6AHL

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Mike.Czuhajewski@hambbs.wb3ffv.ampr.org (Mike Czuhajewski)

Subject: Re Milliwatt reprints

Haven't given up on the idea. As I recall, when I asked if there was any interest, over thirty people replied. I don't know how many of those will translate into orders, but definitely enough interest out there. As you may know, I did this once a couple years ago, in a few small runs, and I'm still interested in seeing the Milliwatt get wider exposure. It falls into the category of True QRP Classic, and is legendary among long-time QRPers. Thirty three issues of QRP circuits, operating news, philosophy, etc, lots of good, interesting and even pioneering things. Perhaps all the more amazing was that Ade Weiss did this in the days before computers and laser printers were available; none of this "send me your article on a disk and I'll load it into the computer"! Anyhow, I'm currently working with someone on the project (which will take a lot of money up-front); the raw prices from his printer-ham friend are much better than Office Depot, but require a minimum order of 50. Naturally there will be lots of added costs, such as shipping, insurance, wrapping materials, and a hundred and one other things, but still hope to keep the price "reasonable". I'll keep in touch. 73 and Queue Our Pea de WA8MCQ

- - -

Mike Czuhajewski, user of the UniBoard System @ wb3ffv.ampr.org  
E-Mail: Mike.Czuhajewski@hambbs.wb3ffv.ampr.org  
The WB3FFV Amateur Radio BBS - Located in Baltimore, Maryland USA  
Supporting the Amateur Radio Hobby, and TCP/IP InterNetworking

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From: Mike.Czuhajewski%hambbs@wb3ffv.ampr.org (Mike Czuhajewski)  
Subject: Re SSB rig in mic

KU7Y said he'd like to see an SSB rig built into a microphone. Since he didn't specify the microphone, does that mean we can use an old D104? And since he didn't specify microphone elements, can we also rip out the original element and replace it with one of those tiny electret jobbers? That would leave us obscene amounts of volume to stuff something into. (And, by the way, both WA5JAY and WG3R could easily pull that one off, allowing these rules--I've seen first hand what they can do when they want.) 73 and Queue Our Pea...

- - -

Mike Czuhajewski, user of the UniBoard System @ wb3ffv.ampr.org  
E-Mail: Mike.Czuhajewski%hambbs@wb3ffv.ampr.org  
The WB3FFV Amateur Radio BBS - Located in Baltimore, Maryland USA  
Supporting the Amateur Radio Hobby, and TCP/IP InterNetworking

-----

From ab4el.com Tue Aug 26 00:00:00 1994

From: Mike.Czuhajewski%hambbs@wb3ffv.ampr.org (Mike Czuhajewski)

Subject: Re simple vs. complex

Lots of replies, lots of viewpoints, but the bottom line is that all of us are building various things, learning, having fun, convincing others to do the same, etc, and that's the important part! (And I agree with WB2CPUs recent comments, too.) 73 and Queue Our Pea de WA8MCQ

- - -

Mike Czuhajewski, user of the UniBoard System @ wb3ffv.ampr.org

E-Mail: Mike.Czuhajewski%hambbs@wb3ffv.ampr.org

The WB3FFV Amateur Radio BBS - Located in Baltimore, Maryland USA

Supporting the Amateur Radio Hobby, and TCP/IP InterNetworking

-----

From ab4el.com Tue Aug 26 00:00:00 1994

From: JEVERHART@cayman.vf.ge.com

Subject: Re:Random Wire Tuner,etc

Several days ago in the thread, the efficacy of using an older tube rig with a pi-network was mentioned. The idea being that those rigs could easily feed a random length wire antenna by virtue of the wide adjustment range of the output pi network. Yes.... but.

The wide adjustment range can potentially get you into trouble, particularly if you just tune for maximum reading on an untuned field strength meter. Back in my novice days (WV2MES - what a call sign!), I had a great rig built from the RAH that used two 1614's in parallel for the final, and it had the usual pi net output.

I bought an 80 meter novice crystal at the local Almo Radio and proceeded to tune up into a wire about 70 feet long. The field strength on my untuned field strength meter was easy to peak. I listened on the band for a CQ that wasn't too fast and nervously replied -- no luck.

For the next week or so, I called other stations and CQ until my keying hand was numb, with only a marginal contact with someone less than 5 miles away. Then the "QSLs" started rolling in! I got 00 notices from all over the east coast and even a dreaded FCC pink slip from California. They all heard me transmitting on 7400 KHz, the out-of-band second harmonic of where I wanted to be.

A local Elmer guided me toward a Lafayette Radio store and suggested I buy one of their tuned field strength meters. When I did, making sure that the strongest signal was on 80 meters, things worked out much better - I worked lots of stuff on 80 and got no more wallpaper for my spurious output.

The moral of the story is, if you use a rig that has a wide range output tuning network to feed a non-resonant antenna, make sure that you are "putting out" where you want to be.

Just my tube sense...

Joe E. N2CX

Be a power resister - just say no to QRO!

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Raymond.Anderson@EBay.Sun.COM (Ray Anderson)  
Subject: Re; RF quadrature generators

- - - - -  
(This is a repost of a message I sent out a couple of minutes ago  
apparently I had some misplaced line feeds or something that muddled  
my ASCII grasphics in transmission. I think it is fixed now. )  
- - - - -

In an earlier posting to the net I mentioned that there was the possibility of the simple digital quadrature generator composed of 2 flip-flops coming up in random states when the power was applied.

The schematic posted before (fig. 1) exhibits that problem. An alternative implementation (fig. 2) reportedly does not have this problem.

I haven't run these circuits thru a digital simulator yet to verify this, but the ARRL Solid State Circuit Design Book claims it is so.

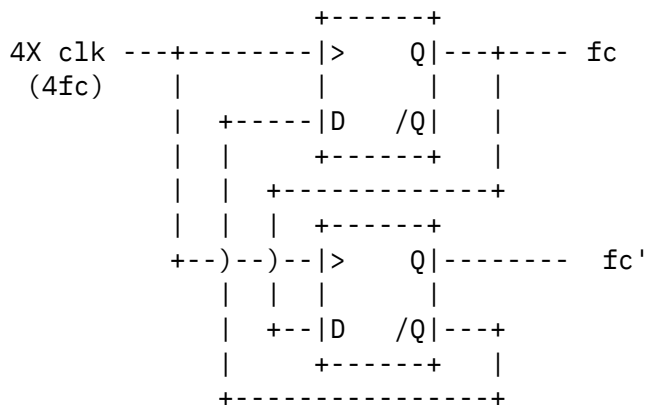


Figure. 1

(may come up in random states)

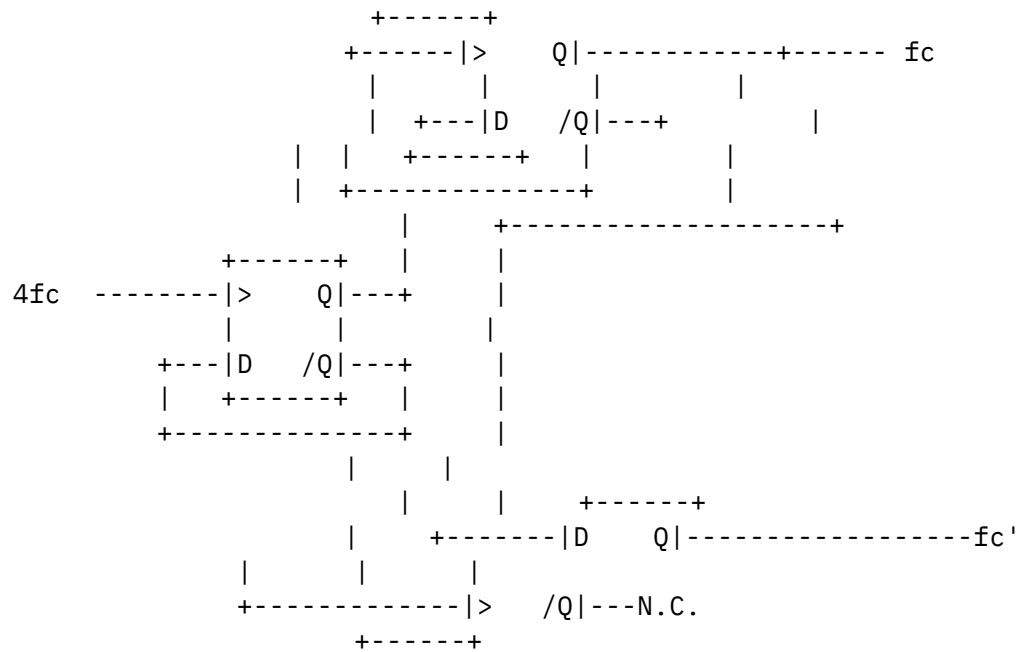


Figure 2  
(always comes up the same)

Just for completeness there is an implementation that requires 2X the clock frequency instead of 4X. The gotcha is that it insists on exactly 50% duty cycle to provide exactly 90 degree phase shift at the output. The above circuits driven by 4X the desired output frequency do not have the requirement for a 50% duty cycle drive signal.

73's de WB6TPU Ray

raymonda@uranium.ebay.sun.com

-----  
From ab4e1.com Tue Aug 26 00:00:00 1994

From: Scott Wood <swood@Vela.ACS.Oakland.Edu>  
Subject: Re: Rig in a 35mm can??

I have not personally made one that small, but my brother made me a nice little transmitter last Xmas that has a film can for a coil core.

I should add that I have seen xmitters that people have build in a ball point pen complete with a short antenna lead, for doing morse code.  
(push a switch where the pen button is (was) as a key)

swood

- - -

If you receive this signature, please return it to it's rightful owner:  
swood@vela.acs.oakland.edu            swood@argo.acs.oakland.edu  
swood@unix.secs.oakland.edu           swood@terminator.rs.itd.umich.edu

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Gary M Diana <gmd@adm01.rfc.comm.harris.com>  
Subject: September QRPP

The Sept issue of QRPP just arrived... a "must have" issue if you are interested in building a QRP SSB rig! Three SSB construction articles are in it: the tiny tim, the rtx, and the epiphyte.

Brad (wb8ygg) and I have gotten two of the Epiphytes built up. One is tested and working, the other is not far behind. If weather permits, I will have mine up and running this weekend; it all depends my ability to get a dipole for 80m put up. The rigs are relatively easy to build, perhaps not a good "first-time" project. There are a couple hard to get parts, but they should serve to challenge the home-brew experimenters out there for substitution/enhancement.

The artwork designed by Derry ve7qk (author of the epiphyte article) is very nice and made intentionally easy to duplicate. The board is about the size of an 3x5" index card. Although the article did not depict the artwork, it is very nice and easy to duplicate. Using the toner method, I made four of the boards in an evening, and they all came out quite nice. I would be willing to distribute the artwork to interested parties, but ONLY AFTER I have received permission to do so by its creator, Derry.

(For those new to the group, the QRPP is the quarterly newsletter of the northern california qrp club.)

73, Gary N2JGU

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: N100Q Tom R. @ MR01 26-Aug-1994 1027 <randolph@est.enet.dec.com>  
Subject: re: Simple vs. complex rigs

Mike C. got it right... maybe 75% of the fun of QRP is slapping a few transistors down on a piece of copperclad and then tuning it up and making contacts with it, at least for me. Also, the knowledge of circuits gained in performing the above is something I value. I'm not really in it to push the state of the art, although I can see the challenge and pleasure that could be gotten from that...

- -Tom R. N100Q randolph@est.enet.dec.com

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: rohrwerk@holonet.net  
Subject: Super Tee Tuner / Long Wi

On 08-24-94 N8ET@delphi.com wrote to qrp@Think.COM:

> Now that I have thoroughly confused everyone - it is in readable  
> format in SPRAT #72 (Autumn '92), QRP Quarterly June '92,(both by W3TS  
> I beleive), and the original article by DJ2LR was in Dec. 1974 QST.  
> Seems like it was also in QRPP.  
>

Thanks, Bill... a variation on this is the tuner mentioned in Nov. 1992 QST,  
"Recent Advances in Shortwave Receiver Design", by the above mentioned DJ2LR.

```

                                200 uH max      500 pF
XFMR -----+-----+-----mmmmmmmmmm-----||-----<
4:1          |       |
stepdown     1uH>    --- 1800 pF max
              |       > ---
              |       |
              +-----+-----+gnd
```

This was designed to match even a long whip down to 1.8 MHz! Just float the tuner's bottom leg from ground and you have the same idea.

> 72/73 - Bill - N8ET Kanga US n8et@delphi.com

```
: John Seboldt rohrwerk@holonet.net / I am Bach of Borg...
: Amateur radio K0JD... / your style will be
: Church of the Annunciation, / assimilated.
: Minneapolis /
```



-> Alice4Mac 2.3 E QWK Eval:05Mar94

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: jeffrey@math.hawaii.edu (Jeffrey Herman)  
Subject: The List

If we're losing our host, think.com, then maybe it's time to discuss our list becoming rec.radio.amateur.qrp - possibly with a moderator if things get noisy.

The new groups, .antenna and .homebrew are a pleasure to read since they each concern just one specific area. Another very quiet group is r.r.swap. I truly believe that r.r.a.qrp would be just as noise-free, for our topic of interest certainly is not controversial in any way.

We've discussed going 'public' before and the majority said 'no' but let's discuss it again in light of possibly losing our host machine, and also in light of how well the new topic-specific groups are doing.

Jeff NH6IL

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: "DONALD A. COLEMAN (EXT. 2850)" <DACOLEMAN@fair1.fairfield.edu>  
Subject: Re: The List

Pardon any redundancy that may result from these operations. I myself consider any such to be someone else's fault--or perhaps to his credit!

My wife has a Seeing Eye dog, and the word is "pfui!" It's from the German.

73

Don Coleman, W1VOQ

From ab4el.com Tue Aug 26 00:00:00 1994  
From: NYOUNG@DESIRE.WRIGHT.EDU  
Subject: The NN1G success story... or

How I build a NN1G for 30 meters and redesigned the board.

Well, I finally have a working NN1G on 30 meters. This is what it took:

Change the 2 pf between the rx input cans to 5 pf.

Rewire the LC ckt on the product detector so that the coild goes to ground. Also one of the 47pf caps in the same circuit also had to be rerouted. (Originally the board trace took the 47pf back to the IF amp and not to ground!)

Cut the foil on the tx mixer which goes to the filter cans and rerout the line to the proper pin on the NE602. It's pin 5, I think (like you expect me to keep notes? Hey, I ain't designing this. I'm just tracing things around so it'll work. I ain't no engineer, y'all.)

Rewind all the toroids that are used as transformers with bifilar wire, color coded.

Carefully check the L values of the pi network on the tx output. If they aren't matched up, weird things happen. Like high swrs into 50 watt loads (Huh? How'd that happen? And what about that spur in the output that goes down in frequency as the tx frequency goes up? You got that one figured out?)

The boards that I got from Dan's SP&K worked, once I got things straightened out. Just two foil traces were off (mentioned above). Now all I need to do is find someone who'll talk to me on it. Oh, I forgot: on the emitter lead of the first driver transistor, the 220 pf was replaced by a 330 pf. That's all it took to get more than 1.75 watts out. So there.

I figured it out myself and I just feel so proud. I mean, where but in America could a linguist find a way to make a radio work? It's like that Frank Zappa song "Call Any Vegetable:" Only in America! ...The vegetables will respond to you. See, the carrot is breathing harder!"

73

Nils

WB8IJN &c

(Sure I make no sense. I drink espressos and the words just roll out of my mouth like drool from a thorazine patient.)

-----

From ab4el.com Tue Aug 26 00:00:00 1994

From: "John F. Woods" <jfw@ksr.com>

Subject: The Toner Method

> Would someone please describe the "Toner Method" of PC Board Creation?  
> I've seen it mentioned a few times in various articles and letters. I've also

> seen the ads for Tek Film. Is that the same process? Thanks, Bruce (AA7AR/6)  
> P.S. My one attempt ended in partial transfer, and curled transparency...

Though you appear to know the gist of it, I'll detail the whole process for the benefit of those who haven't tried it.

The various schemes for creating PC board with "toner" involve conspiring to place a layer of photocopier/laserprinter toner on the copper, melting it in place so that it sticks, in the shape of the circuit you want to reproduce. The plastic in the toner acts as etch resist.

There are five different substrates you can use to try this (that I'm aware of):

- 1) plain photocopier transparency film
- 2) ordinary photocopier paper
- 3) TEK-200 film (translucent heavy duty version of 1, basically)
- 4) Press-N-Peel paper (has a cornstarch-based coating that acts as a release mechanism)
- 5) Press-N-Peel Blue (transparency film with this blue stuff on one side)

The steps involved in all of these are essentially:

1) Prepare a mirror image of your circuit. If you're using a laserprinter, it can be in any convenient drawing or CAD program; if you're using an ordinary photocopier, you can reverse an existing layout by copying onto transparent film (even TEK-200) and, well, reversing it when you photocopy. (TEK-200 film can be cleaned with acetone (I think it is).) If you use a special-purpose film, make sure you copy onto the correct side (the instructions that come with it will tell how to figure that out).

2) Scour the copper absolutely clean with something that won't scratch it up (no steel wool :-); those green Scotch-brite plastic-wool pads work well, and I've heard a couple of brands of kitchen tile cleaners recommended (Bon Ami is the one I use).

3) Place the image on the copper (toner side down!) and secure it with masking tape (I usually cut the film to size and tape around from the top of the pile to the bottom), though the tape is actually neither necessary nor sufficient: if you're really careful, you can get by without it, and once you heat things up, the tape will melt anyway...

3b) If you use plain photocopier film, you may want to put a piece of plain paper on top; not all photocopier films can take what's about to happen...

4) Take a hot clothing iron ("cotton" setting, around 200 degrees (no steam :-)), and press it firmly on top. Let the board heat up, then gently start moving the iron around to ensure that the surface is uniformly hot and press enough to ensure that the melted toner makes good contact with the copper but not so hard as to squash out all the details. WARNING: you want to melt the toner without melting

the film; the special purpose films are somewhat sturdier than plain transparency film, but if you work at it hard enough, you can melt them, too :-).

5) When the toner has transferred (how do you know? Bwahahahahahahahah! Actually, there's usually a noticable change in appearance, except when the film is actually paper, in which case, you just have to practice, practice, practice), remove the iron and let it cool.

5a) Press-N-Peel paper: dunk the board into water. The water dissolves the cornstarch, the paper floats away. Wash gently, proceed to step 6.

5b) Ordinary paper: dunk the board into water. When the paper is completely sodden, gently pick off the pieces, removing tiny bits of fluff from the toner traces. Proceed to step 6.

5c) Others: slowly, gently, peel away the film. If a major section failed to transfer, you may be able to reheat the film and press it down a second time. You may not be able to. Once the film is removed, proceed to step 6.

6) Repair the image: it is almost inevitable that the image didn't transfer perfectly. You can retouch small errors with a permanent marker (collect a WHOLE BUNCH of Sanford Sharpie(R) markers...). Remember to look VERY CLOSELY for traces with hairline breaks and pinholes (some of which may have been photocopier artifacts).

7) Etch with your favorite heinous chemical.

8) Clean with etch-resist cleaner (GC sells what I think is roughly pure hexane) and a scotch-brite pad, tin if you like, drill, stuff, and enjoy.

I have used all of the media except plain paper (which someone on sci.electronics claimed would work, but I'm skeptical). In all cases, the results are heavily dependant on which photocopier you use (so don't buy a case of film until you've had it work), and various people swear by one method and claim that the others are worthless.

I had poor results with plain transparency film (melts too easily), and mediocre results with TEK-200 film and Press-n-Peel paper (though the latter, as they claim, can indeed be used to make stick-on decals). However, I recently tried Press-n-Peel Blue, and was absolutely astonished by the results -- the blue stuff works both as a release mechanism and to improve the integrity of the resulting traces. Not only didn't I have to doctor the board I did (until after I etched it, when I discovered I'd COMPLETELY FORGOTTEN a trace...), but the 4-point labels I put on the diagram \*actually appeared and survived etching\*.

Of course, YOUR photocopier's toner probably won't even STICK to P-n-P Blue, so there's no guarantees, but from my experience, I think I'd try that one first, then TEK-200, then Press-n-Peel paper. Unfortunately, I think that's in order

of decreasing expense, so you might want to try the other order (perhaps starting with plain photocopier transparencies).

73, John, WB7EEL/1

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: dgf@netcom.com (David Feldman)  
Subject: Using RG174 for portable antennas

I may end up with alot of RG174. Are there any interesting wire antenna designs that could benefit from using coax in the active elements? I'm particularly interested in wide-bandwidth 80/75M wire antennas.

73 Dave WB0GAZ dgf@netcom.com

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: "SLRC1::M405142" <M405142%SLRC1.decnet@mdcgwy.mdc.com>  
Subject: Wanted: Keyer/paddle

Wanted: Paddle, keyer for portable operation. Reasonably priced, so I don't have to worry about it (them). THX. N0XEU Matt (314) 962-1418

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: JimN0OCT@aol.com  
Subject: XEROX PCB.....

Just my USD0.02 regarding the "toner method" of transferring pc traces to copper. It is VERY dependent upon the type of copier you use. We have a newfangled Kodak Geewhizmo copier at work, and in trying to make a board for the Neophyte I wanted to build I discovered two things: clean the heck out of the copier glass and experiment with a number of different transparency types.

I tried the Tek stuff and it performed horribly. No doubt due to the copier. I tried heavy duty copier compatible transparencies and medium duty transparencies. The medium duty worked best. This is due, I think, to the heavier duty stuff not allowing as much heat to transfer from the iron to the pcb (this may also be horsefeathers).

Bottom line, be willing to try a coupla different methods. One is bound to work, none is Nirvana.

```
Seventysomething,  
Jim n0oct
```

From ab4e1.com Tue Aug 26 00:00:00 1994  
From: "Stephen C. Trier" <sct@thor.INS.CWRU.Edu>  
Subject: [none]

: Stephen Trier <sct@po.cwru.edu>  
Date: 27 Aug 1994 00:14:48 GMT  
To: qrp@think.com  
Subject: Re: Re; RF quadrature generators  
In-Reply-To: Raymond.Anderson@EBay.Sun.COM (Ray Anderson)  
Fri, 26 Aug 1994 14:09:52 +0800

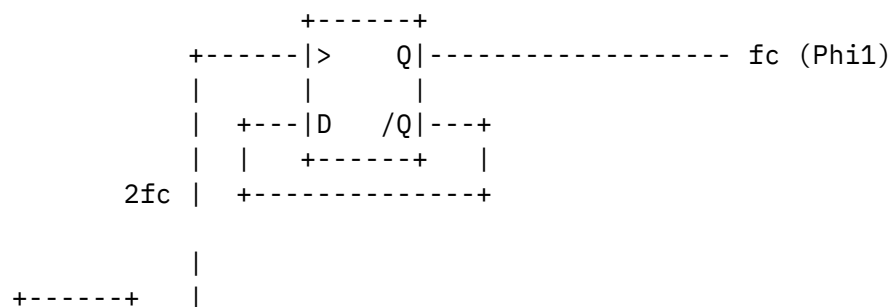
Ray Anderson writes:

```
> I haven't run these circuits thru a digital simulator yet to verify this,  
> but the ARRL Solid State Circuit Design Book claims it is so.
```

Actually, what my copy of the book says is this: (Page 184)

Specifically, if two quadrature (90-degree phase difference) outputs are desired at a frequency  $f_c$ , one starts with an oscillator at  $4f_c$ . This signal is applied to a digital divider using a flip-flop with complementary outputs. The result will be two output signals at a frequency of  $2f_c$  which are 180 degrees out of phase with each other. Each of these signals is applied to flip-flop dividers. The resulting outputs will be at the desired  $f_c$  and will be in quadrature.

OK, at this point they are describing a three-flip-flop circuit:



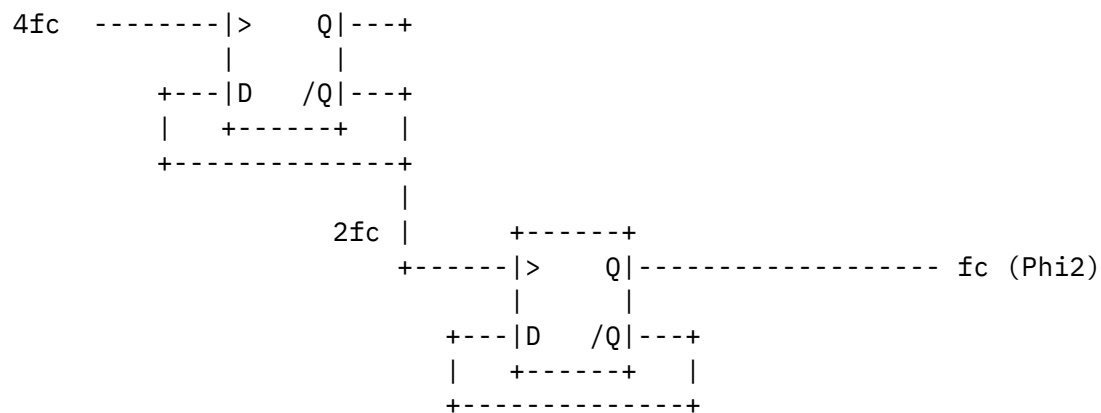


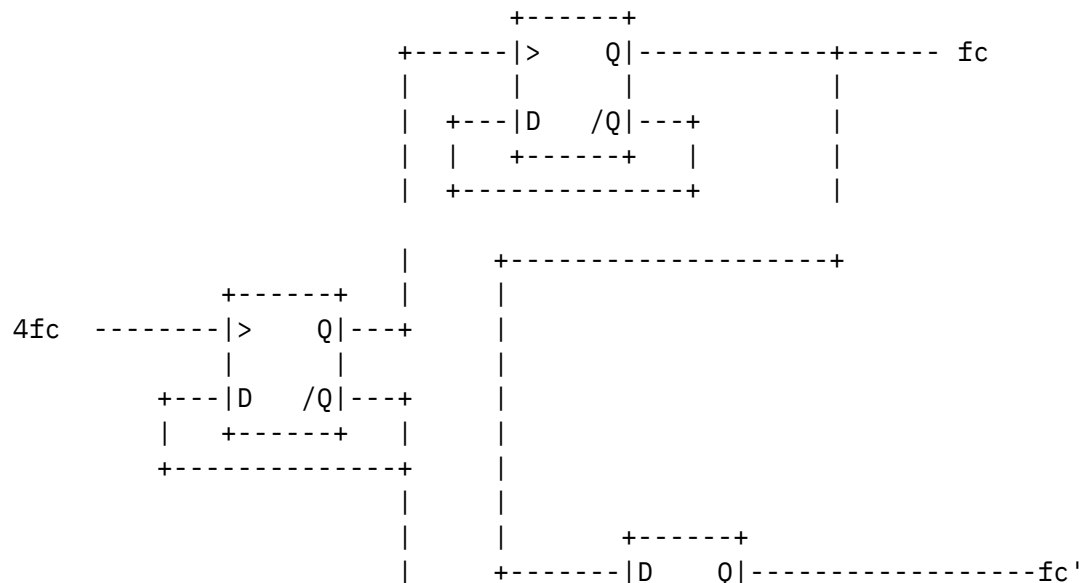
Figure 3  
(the `_SSD_ strawman`)

This circuit will start up with a sideband that depends on the random power-up states of `Phi1` and `Phi2`. It's complicated to see why, since there are 8 possible power-up states, but 4 of them pick one phase and 4 pick the other.

`_Solid-State Design_` solves the strawman's problems with the following sentence:

A slightly more elaborate interconnection of digital ICs will be required than that describe, in order to ensure that the proper sideband will result every time power is applied. This is shown in [Figure 2].

Here is our Figure 2:



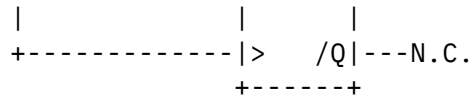


Figure 2

(SSD's design -- always comes up with the same phase relationship)

Neither of these designs are the simpler two flip-flop ring counter. You're right, it's in the ARRL Handbook. Why did SSD ignore the ring counter when it's clearly simpler? My guess is that the authors didn't know about it or thought it too hard to explain. In 1977, thorough knowledge of digital was not as wide-spread as it is today.

Anyway, if you'd like to analyze the designs, a brute-force technique is to make a table with one entry for every possible startup state. The three-flip-flop designs need 8 entries, and the two-flip-flop version needs 4. Compute an output vector for every possible starting state. I think you'll find that Figures 1 and 2 have predictable behavior in all states and Figure 3 does not. Analysis of Figure 1 is already done, since I listed the sequence of states in a previous message.

> Just for completeness there is an implementation that requires 2X the  
> clock frequency instead of 4X.

That version would involve replacing the leftmost flip flop of figure 2 with an inverter, right?

Stephen

- - -

Stephen Trier                    The photovoltaic cell is not an electronic device  
sct@po.cwru.edu                in the accepted sense, since the conduction through  
KG8IH                            it occurs in a semiconductor....

- Standard Handbook for Electrical Engineers, 1941

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From: dick@kanga.demon.co.uk (Dick G0BPS)  
Subject: antenna.crap

Hi gang,  
I am sorry to grab your attention with the header but...  
I have seen lots of <>\*&\* on aerial / antenna theory  
Lets get it straight. A simple transmitter generating RF  
at an amateur frequency will pass that RF to almost any feeder



Forget the required dipole, the beam, the quad. Shove up the greatest length of wire you can in a straight direction and cut it in the middle. Treat that cut as the centre point of a dipole/doublet and you have an aerial that works.

— — —

[ The opinions expressed here are always that of the management, ]  
[ I am the management!! (especially when she lets me) ]

Subject: antenna.crap

```
> Forget the required dipole, the beam, the quad. Shove up the greatest
> length of wire you can in a stright direction and cut it in the middle
> Treat that cut as the centre point of a dipole/doublet and you have an
> aerial that works.
```

```
: John Seboldtrohrwerk@holonet.net / I am Bach of Borg...
: Amateur radio K0JD... / your style will be
: Church of the Annunciation, / assimilated.
: Minneapolis /
```

```
-> Alice4Mac 2.3 E QWK Eval:05Mar94
```

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Mark J Schreiner <schreine@pogo.den.mmc.com>  
Subject: Re: antenna.crap

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: CLAYTOND@gvg47.gvg.TEK.COM  
Subject: hollywater nine

Fellow QRP,ers:

Iam looking for a good used HW-9 in original condition with only minimal mods and clean cosmetics. Would appreciate any leads.  
Best regards,  
Don Clayton, K6DFF

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From:rohrwerk@holonet.net  
Subject: inet rig, lets go...

On 08-24-94 mont@netcom.com wrote about the R2/T2

> Now the next part, the vfo. ----- I've thought  
> about using the Techno Whizzy DDS VFO, it's absolutely marvelous for  
> accuracy, but it requires to much supporting circuitry (a computer,  
> microcontroller, or something to give it flexibility) to me. I figure  
> it would be easier to use a well designed stable vfo and an accurate  
> frequency counter with display.  
>

Most current low-cost DDSs are a little too noisy and dirty for good receiver use, unless you lock a PLL to it the way lots of rigs do today.

You want the ultimate low-cost, wide-range VFO for the home user, try my transistorized T-368 exciter route. This 1950's Collins military tube unit is available from Fair Radio Sales for \$45, and has a 1.5-3 MHz PT0, multipliers to 3-6, 6-12, and 12-24 MHz, and nice tight gearing and a digital dial. Tunes rather fast, but you can set it quite precisely with a slow hand because the gearing is so good. For ultimate accuracy, you could add a frequency counter (the digital mechanical display is not super-precise like the R-390 receivers).

I have mine transistorized, with receive and transmit offset on 10 turn pots. This baby doesn't move, folks. Even on the highest band I get, say, 10-20 Hz drift overnight (measured "by ear") relative to 15 MHz WWV. The frequency doesn't pull at all with varying loads. You couldn't build anything better. It's definitely bulky, so not for portable use.

I'll send a 14K file on what I did to it to anyone interested.

> Bandpass Filters ----- Well there's lots of these around.  
> I want to design a circuit board with several filters for different  
> bands and have them switched in and out with pin diodes. Can I use  
> the same filters for output that I use for input? Or would it be  
> better to have separate tx/rx filters?  
>

If you have a lowpass filter on the output, and a standard diode switch arrangement for QSK, you MAY get by in a relatively RF free environment. Me, I have a 50 kW AM broadcaster about 5 miles away, so I have to filter everything. The usual 2-section top-coupled bandpass filter is quite adequate for the receiver input. I guess you could use a power bandpass filter on the output of the transmitter -- a recent QST had a set of them good to 150 watts. Then you could take care of your filtering for TX AND RX.

Only question is harmonic suppression of a 2-section bandpass filter relative to a 5 or 7 element lowpass filter. I'm gues

|                               |                        |                      |
|-------------------------------|------------------------|----------------------|
| : John Seboldt                | rohrwerk@holonet.net / | I am Bach of Borg... |
| : Amateur radio K0JD...       | /                      | your style will be   |
| : Church of the Annunciation, | /                      | assimilated.         |
| : Minneapolis                 | /                      |                      |

-> Alice4Mac 2.3 E QWK Eval:05Mar94

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Clark Fishman (FSAC-FCD) <cfishman@PICA.ARMY.MIL>  
Subject: low power op amp

Just got a sample from National Semi...its a LMC6061 Precision CMOS single Micropower op amp

this chip needs a whopping 20 microamps of power from the battery for operation.....good for a DC RX...

got to try this puppy

-----

From ab4el.com Tue Aug 26 00:00:00 1994  
From: jeffrey@math.hawaii.edu (Jeffrey Herman)  
Subject: more on tuning the tuner

Along the lines of what's just been posted, I just read in one of my older books that when adjusting C in your tuner you will (of course) see two peaks in the power output; the author went on to say choose the peak in which the capacitor is most fully meshed, for this will be the true output freq, not the harmonic that you're tuning to.

To tell you the truth, I've never bothered to look at which peak provided the fullest mesh. I know that one peak sounds good on my rcvr and the other sounds rotten - so I choose the better sounding one.

Jeff NH6IL

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Raymond.Anderson@EBay.Sun.COM (Ray Anderson)  
Subject: quadrature stuff from r.r.a.homebrew

Attached below are a couple of files captured from r.r.a.homebrew over the past year that deal with phasing receivers/transmitters and the experiences and observations a few people have made about them. Since there has been an ongoing discussion on that topic here on the qrp list I thought this may be of interest to some people who might not have seen the original posts.

Ray WB6TPU  
raymonda@uranium.ebay.sun.com

- -----included file starts here-----

In article <2626@arrl.org> zlau@arrl.org (Zack Lau) writes:  
>In rec.radio.amateur.homebrew, gary@ke4zv.atl.ga.us (Gary Coffman) writes:  
>>  
>>There's a real simple way to get a 90 degree shift. Have your oscillator  
>>drive a divide by four circuit arranged as one JK driving two other JKs,  
>>one driven by Q and the other driven by not Q. You can take your quadrature  
>>components from the latter pair of FFs. Of course your oscillator must  
>>run at 4X the IF frequency, but that's not a problem. If you use HS parts  
>>for the JKs, your quadrature outputs will be nearly ideal square waves  
>>which is exactly what you want to drive diode ring mixers efficiently.  
>  
>I tried flip flops with a 160 meter phasing receiver many years ago.

>It sort of worked, but after doing some calculations, realized that  
>you need really \*fast\* flip flops to get an accurate 90 degree  
>phase shift. It probably isn't a problem at 160 kHz with fast logic  
>devices, though. On 440 MHz, good luck...

Well sure. :-) If you want to do on channel phasing at UHF, you need  
GAS parts, or do it the old fashioned way with a trombone section.  
However, good HS parts, or in a pinch ECL parts, will suffice for any  
HF band.

>>Getting that blankety blank audio phase shift to be exactly 90 degrees  
>>at every frequency over a 3 octave range is still the hard part.  
>

>My perspective on this is different. With computer modeling, I think  
>you can get an extremely good idea what the phase shift will be at  
>audio frequencies. Thus, I had no difficulty modeling my circuit and  
>building something that closely approximated my model. Figuring out  
>the expected error isn't too difficult, either. On the other hand,  
>try and calculate the expected amplitude error through the mixer and  
>amplifiers vs. frequency.

Well if you use good diode ring mixers, hard clamped by the driving  
square waves, the amplitude error should be tiny. I've used SBL-1s  
successfully this way. You shouldn't introduce amplifiers in the  
phasing section. However, we need phase errors much less than 1 degree  
at each frequency over the audio bandpass to get decent sideband  
cancellation, and I haven't been able to do that because the sharp dt  
errors introduced between harmonies make the audio sound cruddy, IE there's  
a differential time delay that's frequency dependent in the audio phasing  
networks that screws up the relationships among the audio components. The  
voice winds up sounding dissonant. If the audio is going to sound bad at  
high opposite sideband suppression ratios, I'd rather use the filter method.

Gary

- - -

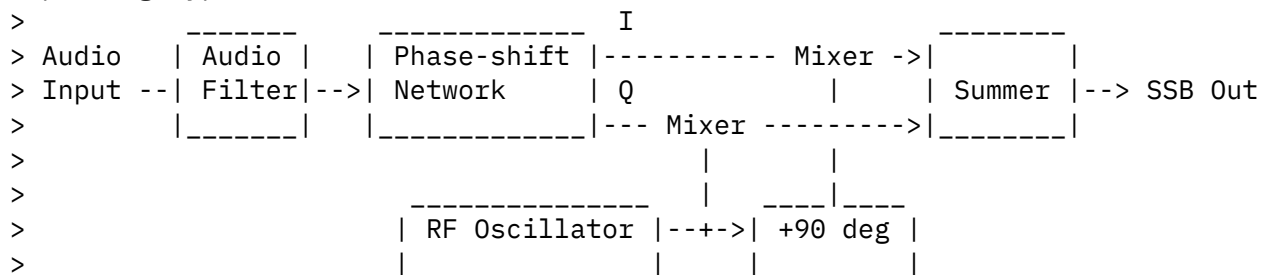
Gary Coffman KE4ZV | Where my job's going, | gatech!wa4mei!ke4zv!gary

- -----next file starts here-----

As quoted from <CnG3Jt.Htw@srgenprp.sr.hp.com> by alanb@sr.hp.com (Alan Bloom):

> In another thread, I claimed that phasing-type single-sideband generators  
> sound better than filter-type generators because phasing excitors have

> flatter amplitude and delay response. Gary Coffman disputed that. Rather  
 > than respond to Gary's long replies in detail, I'll just summarize how  
 > phasing-type SSB exciters work:



> I and Q are two audio outputs with a constant phase difference between  
 > them of 90 degrees. The input filter limits the audio frequency response  
 > to the range of the phase-shift network. The "+90 deg" box can be switched  
 > to -90 degrees to get the opposite sideband. (The output of each mixer is  
 > a DSB signal.)

> The audio phase shift network is the interesting (read difficult) part  
 > of the system. It must maintain a 90 degree phase difference and  
 > excellent amplitude matching between the two outputs over something like  
 > a 10:1 frequency range (300 Hz - 3000 Hz). It generally does that by  
 > causing each of the two outputs to have a constantly-rising phase shift  
 > versus frequency characteristic, like thus:

<much deleted>

So, the audio phase shift is the only 'interesting' part...  
 How, pray tell, can one having only the usual ham test gear (scope,  
 probably, dmm, maybe power supply) make the RF phase shift be 90  
 degrees and the same amplitude at, say 12MHz?

My dual-trace scope is not perfectly calibrated, so that's  
 out. Generating 48MHz and using flip-flops to get 12MHz in quadrature  
 doesn't work well in reality (theory is great, but unless your 48MHz  
 signal is *\*exactly\** 50% duty cycle it has a *\*strong\** component at just  
 under half of 48MHz, usually near 22MHz. Flip-flops, like all  
 non-linear devices, are very good as mixers, and the 22MHz mixes with  
 the 12MHz to make some *\*interesting\** spurs. Filtering out these spurs  
 usually trashes the 90 degree and equal amplitude you got in the first  
 place, leaving you back at square one.)(yes, i do know about this.  
 i've tried it. repeatedly. i KNOW phasing sounds better, and i  
 WANTED it to work *\*sigh\**). Generate it in quadrature with a dual DDS  
 and two DACs? Then you must filter the DACs outputs through two  
 different filters, introducing slightly different phase and amplitude  
 errors.

I wanted it to work. Really. I've listened to DC receivers  
 and to crystal filtered super-hets and the difference is amazing.  
 However, I also want to be able to build a receiver and actually *\*use\**  
 it, not spend eternity designing the 'perfect' one.

One other interesting thing re: phasing vs filtering: you'll need \*some\* additional filtering to do a transmitter anyway (for SSB at least). This filter will cost you \$\$, and if you already have to spend the \$\$ why not use it for the receiver too? That rather neatly explains why darned few commercial ham rigs use phasing any more.

- - -

While (its\_not\_working())  
    mess\_with\_it();

John Welch, N9JZW  
jjw@seastar.org

- -----end of included files-----

-----

From ab4el.com Tue Aug 26 00:00:00 1994

From: Adrian Weiss W0RSP English Department <AWEISS@charlie.usd.edu>

Subject: RE: rcvr as field strength meter

Jeff:

It all depends.

If your tuner is entirely enclosed in a metal cabinet, with good coax connections with the rig, then radiation will be minimized. A lot of variables are in play.

For one, you can't assume that the receiver is isolated from any such radiation within the shack. Receivers are super-sensitive when compared to any f.s. meter. They can pick up minute levels of r.f. from the a.c. outlet shared with the rig etc. There can be a number of paths through which a receiver will pick up r.f. that can be confused with what is radiated from an antenna. Given the sensitivity of a receiver, you can't be sure even when it is hooked to an outside antenna.

Ideally, the f.s. meter pick-up antenna is not even in the shack. Otherwise, you can't be sure that you're reading antenna r.f. I've generally had more than one antenna up at a time and used the spare as the f.s. pick-up antenna. I had to put a potentiometer in the f.s. meter to control the sensitivity because, depending on the band, mutual coupling between the radiating and the pick-up antennas was such that a very powerful amount of r.f. was picked up. On other bands, I'd have to crank the f.s. meter to full sensitivity and strain my eyes. But, in any event, I was sure that whatever was being indicated came from the radiating antenna rather than stray radiation in the shack.

Just off the cuff, I'd try some kind of experiment to see if the receiver is responding to tuner or feedline radiation. I'd cut a piece of coax just long enough to probe around the tuner and feedline and plug it into the rx. Then "sniff" around with the open end of the coax while the receiver sensitivity is adjusted for barely detectable S-meter response. If you run across any source of stray radiation, the S-meter ought to jump a bit.

73, Ade

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Sparks <mdennehy@alf2.tcd.ie>  
Subject: testing ...

Just to see if I re-subscribed right !

--  
Mark "Sparks" Dennehy            Ham Radio : EI5EDB (2m FM only) :-(  
Engineering Undergrad        Internet : mdennehy@alf2.tcd.ie  
Trinity College Dublin        Telepathy : mdennehy@Mars.Red.Planet

From ab4el.com Tue Aug 26 00:00:00 1994  
From: jeffrey@math.hawaii.edu (Jeffrey Herman)  
Subject: tuning ant. tuners

Looking through some of my '60s projects books I see some of the  
tuners utilize an NE-2 neon bulb in series with a small inductor  
and held close to the antenna lead in; supposed to tune for maximum  
brightness.

QRPP generally won't light an NE-2. Has anyone tried using an LED  
in series with a few turns of wire:

```

      +---LED---+
      |         |
      |         |
      +---UUU---+
===== <--antenna leadin
```

This can double as a frequency counter - just count the on-off light  
pulses of the diode....

Jeff NH6IL

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: Adrian Weiss WORSP English Department <AWEISS@charlie.usd.edu>  
Subject: RE: tuning ant. tuners

Jeff:  
My eyes are bad, so I won't get the frequency count right.



Did you miss the posting about a week ago which described a current-pickup using an LED? Perhaps the designer will post it again. Used an FT-50-? core with twenty windings slipped onto the lead, feeding a resistor/capacitor energizing the LED. I hope he posts it again so I can get the details right! I want to put one together myself -- after I get done painting the house and putting my antenna back up!

73, Ade

-----  
From ab4el.com Tue Aug 26 00:00:00 1994  
From: John Seboldt <rohrwerk@holonet.net>  
Subject: RE: tuning ant. tuners

> My eyes are bad, so I won't get the frequency count right.  
> Did you miss the posting about a week ago which described  
> a current-pickup using an LED? Perhaps the designer will post  
> it again. Used an FT-50-? core with twenty windings slipped  
> onto the lead, feeding a resistor/capacitor energizing the  
> LED. I hope he posts it again so I can get the details right!

It was me, K0JD!

My transformer works well at QRP: an FT-50-43 with about 20 turns #24 or #28 wire. One lead feeds a 1N914 diode (anode end); a filter capacitor (.1 uF) goes from the diode output to the other coil leg. The LED goes between the bottom of the capacitor and the output of the diode -- anode of LED to cathode of 1N914. I did not try putting the LED directly across the coil; it might work, but I guessed that the LED's may not be fast enough to directly rectify the RF.

Because of the filter cap, the LED receives DC, preventing your eyes from seeing the pulsating RF directly. (I couldn't count fast enough, anyway).

You could also use a meter in place of the LED. That's what I was doing initially, so I just added the LED.

This also worked with a T-106-2 I had lying around -- used it because it was big enough to slip over the alligator clips on my open wire line!

John K0JD

-----